

An Inaugural Essay  
on the  
Circulation of the Blood  
for the degree of  
Doctor of Medicine  
in the  
University of Pennsylvania  
by Joshua Rhoads  
of Pennsylvania  
Philadelphia Jan. 1828.

1. *Leucanthemum vulgare* L.

*Leucanthemum*

*vulgare* L.

*Leucanthemum*

*vulgare* L.

1.

*Leucanthemum vulgare*

*vulgare* L.

*Leucanthemum*

*vulgare* L.

## On the Circulation of the Blood.

Previous to entering, on the consideration of the particular powers, concerned in circulating the Blood; and before we undertake to investigate their relative influence & import; it will be proper to take a general view of the circulation, & of the simultaneous operation of the various powers contained, as we find them in man.

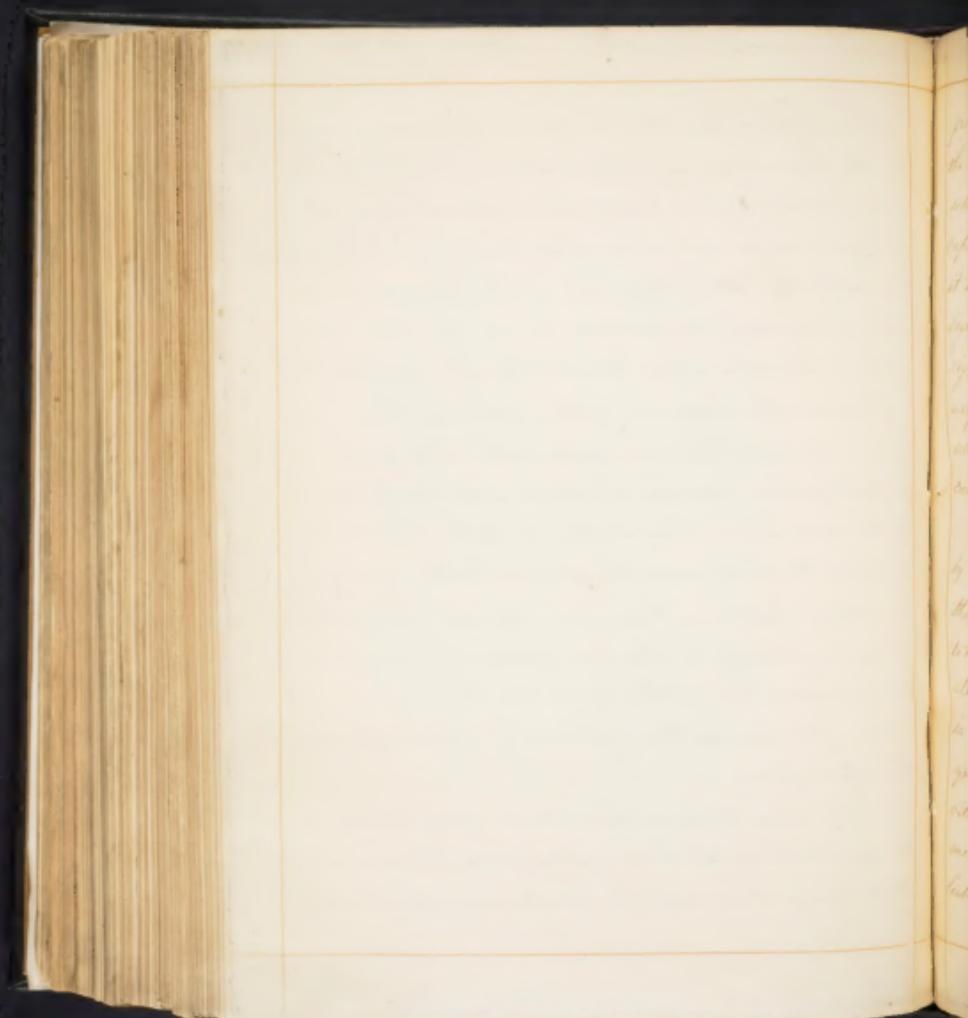
Anterior to the time of the illustrious Bichat, the circulation was divided by most authors into the great, & small, or Systemic, & Pneumonic: This division, (though apparently of small moment,) exercised a deleterious influence, on the Physiology of the circulation: for by it, the Heart is placed in relief, by being the beginning, & termination of both systems; whilst the capillaries are thrown into the background. From this circumstance, Physiologists were for a long time, induced to overlook their



action, & consider the Heart, as the principal station in the circulation. But Bichat, with that discrimination & judgment which he always displayed, and which enabled him to give Physiology, that station & stability, which its importance to Pathology, and its interest to the inquiry into Nature & Nature's works, entitle it; divided it into 1st. "Vascular system with Red Blood" & 2nd. "Vascular system with Black Blood".

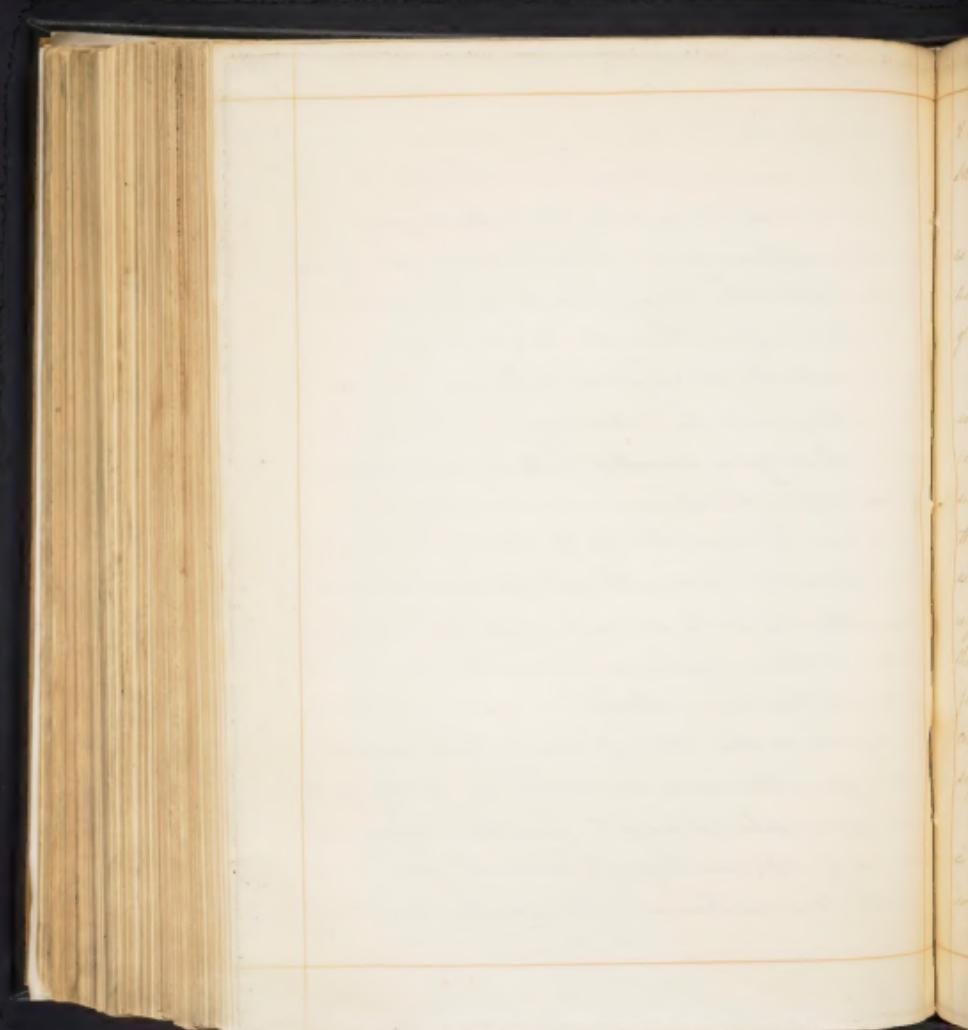
1) that which conveys the Blood from the Pulmonary to the general capillary system & vice versa. That which conveys the Blood from the General to the Pulmonary capillary system. Here we see the Capillaries at each extremity of the two systems; & can perceive at a glance, the relation our circulation bears, to that, of some of the inferior animals: for example the caterpillar.

The circulation of Red Blood commences in the capillaries of the Lungs, this flows through the Pulmonary Veins into the left auricle of the Heart;



from the left auricle into the left ventricle; from the left ventricle it is driven into the Aorta, through whose branches it is distributed to the general capillary system, where it is converted into black. It then enters the Veins, which transmit it to the right auricle; from the right auricle it enters the right ventricle, which pumps it through the Pulmonary artery, into the Pulmonary capillary system, where it is again converted into red, & pursues the course before stated.

Since the circulation of the Blood was discovered by the immortal Harvey, Physiologist have directed their attention to the powers by which it is moved, & to their relative influence & importance: But although they have attained a degree of certainty in regard to the action of some of these powers, yet (from the numerous variations to which the vital principle is subject, from our imperfect means of ascertaining, & above all from our liability to form theories & opinions, in uncertain

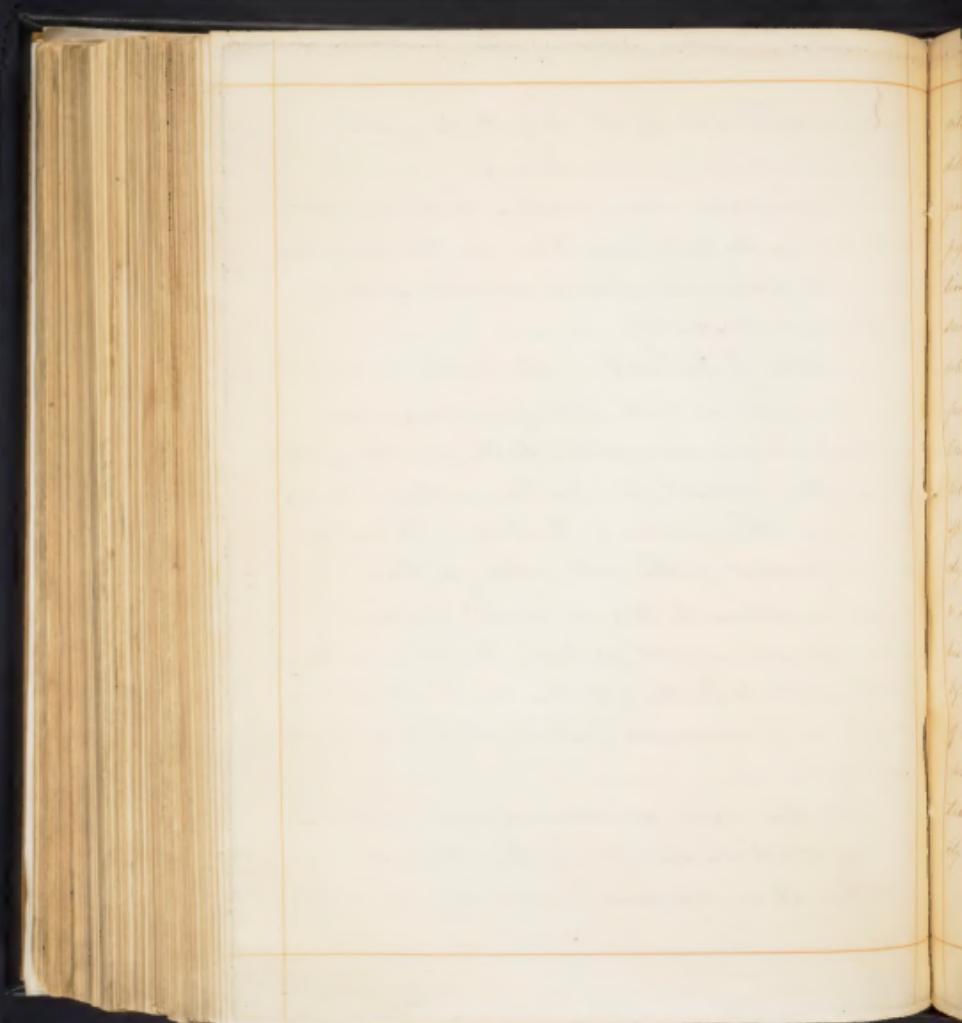


8 insufficient data,) the subject may still be said to be obscure & uncertain.

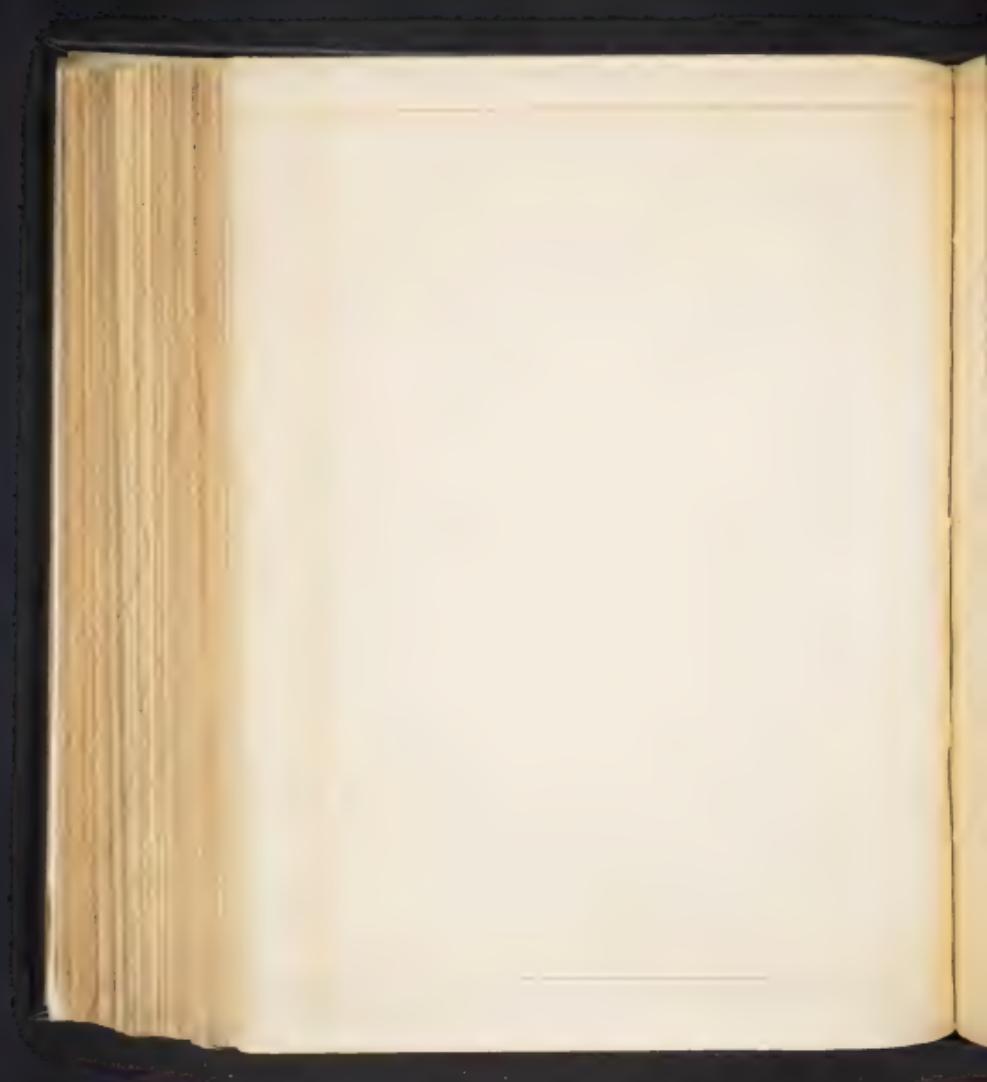
Having said thus much, to the circulation as a whole, we will now take up the consideration of the principal powers concerned, & treat of them individually.

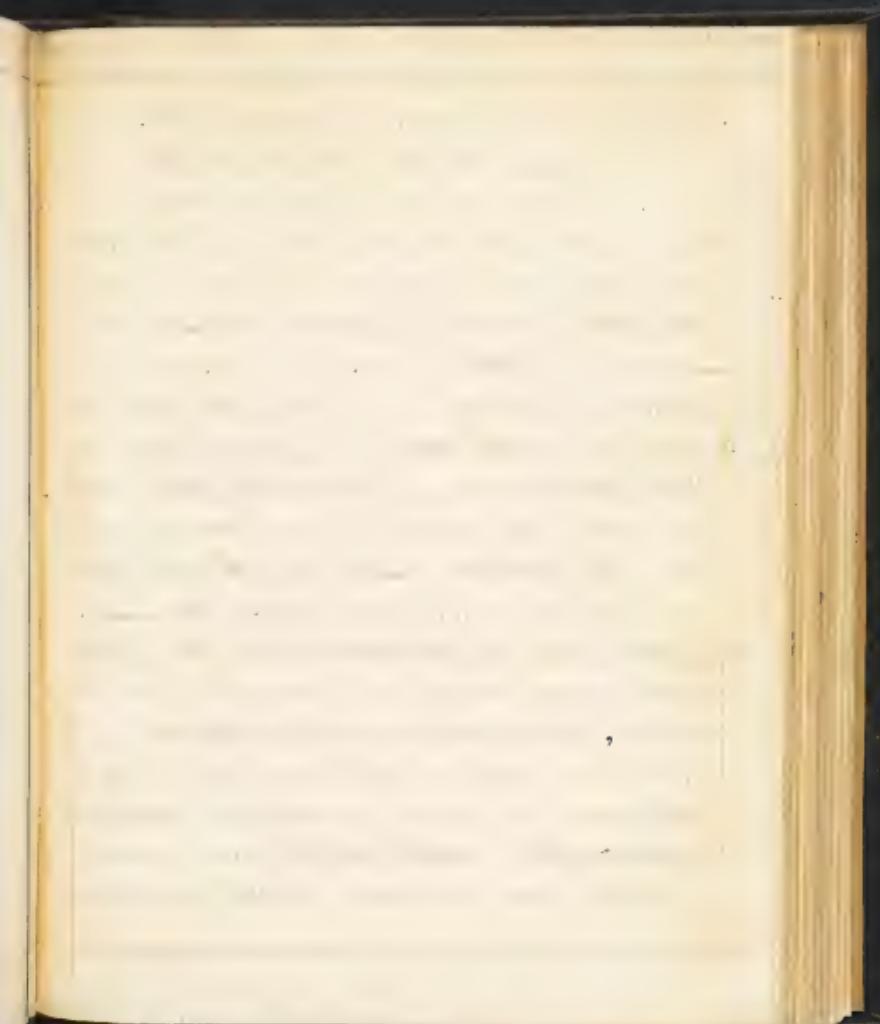
1. First of the Heart. The Heart is a hollow muscle, endowed with vital properties, which continue longer susceptible to the operation of stimuli, after animal life has been extinguished, than any other portion of the body. Its motion is independent of the will, although there are a few exceptions to this in regard; but even in these cases, it is most probable that the individual first ceased to breathe, & then the Heart motion ceased as a consequence; such at least is Bochart's supposition.

That this organ is endowed with contractility is very evident, but it is legitimate to doubt, whether it is possessed of what may be called









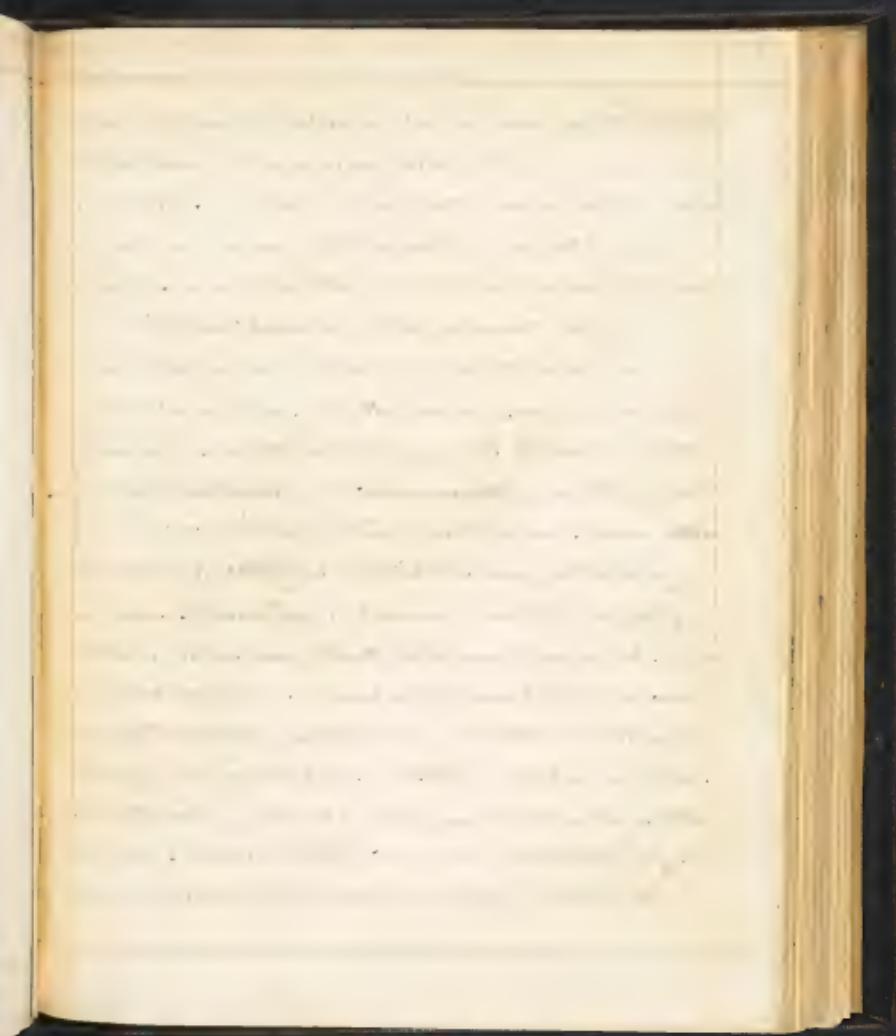




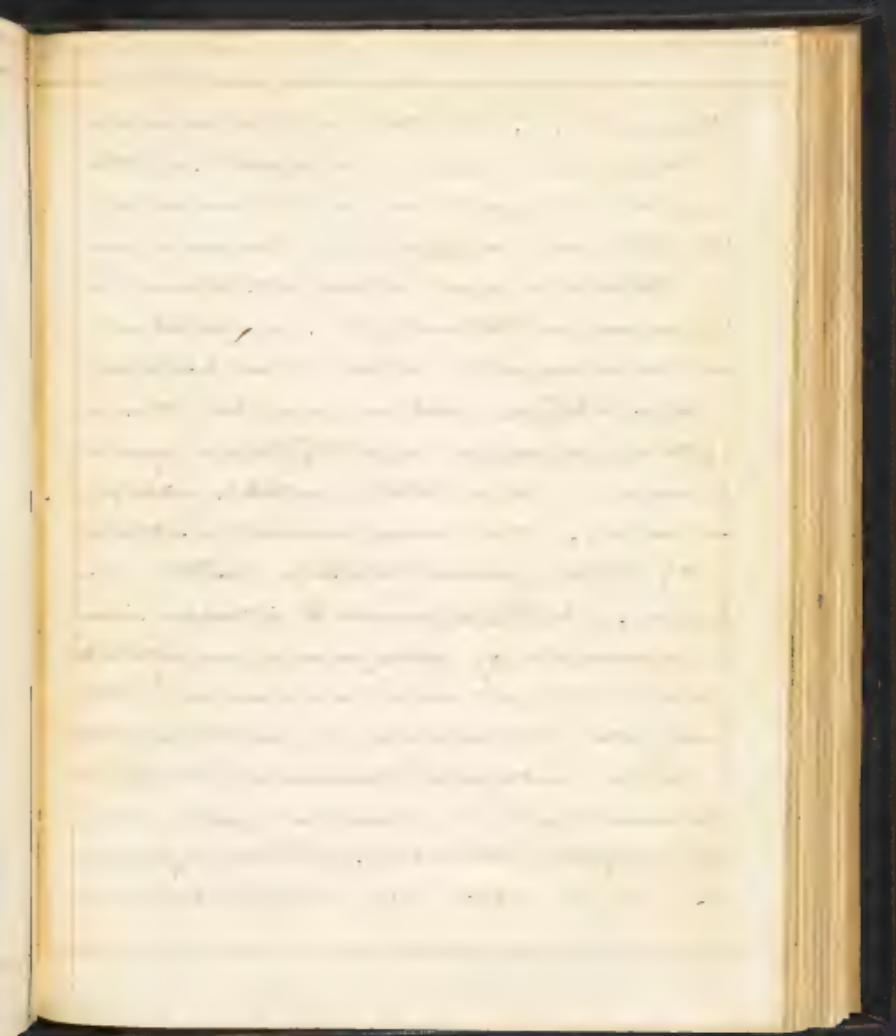






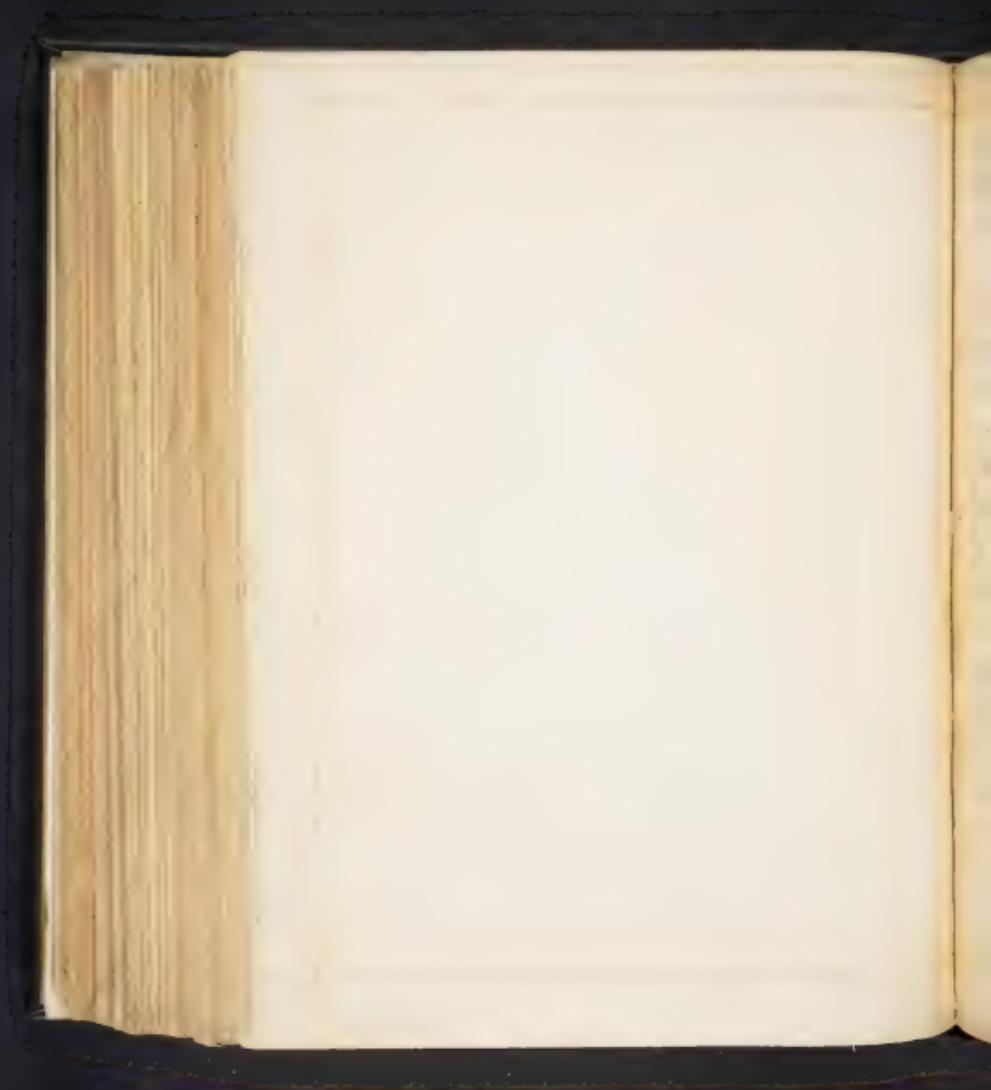






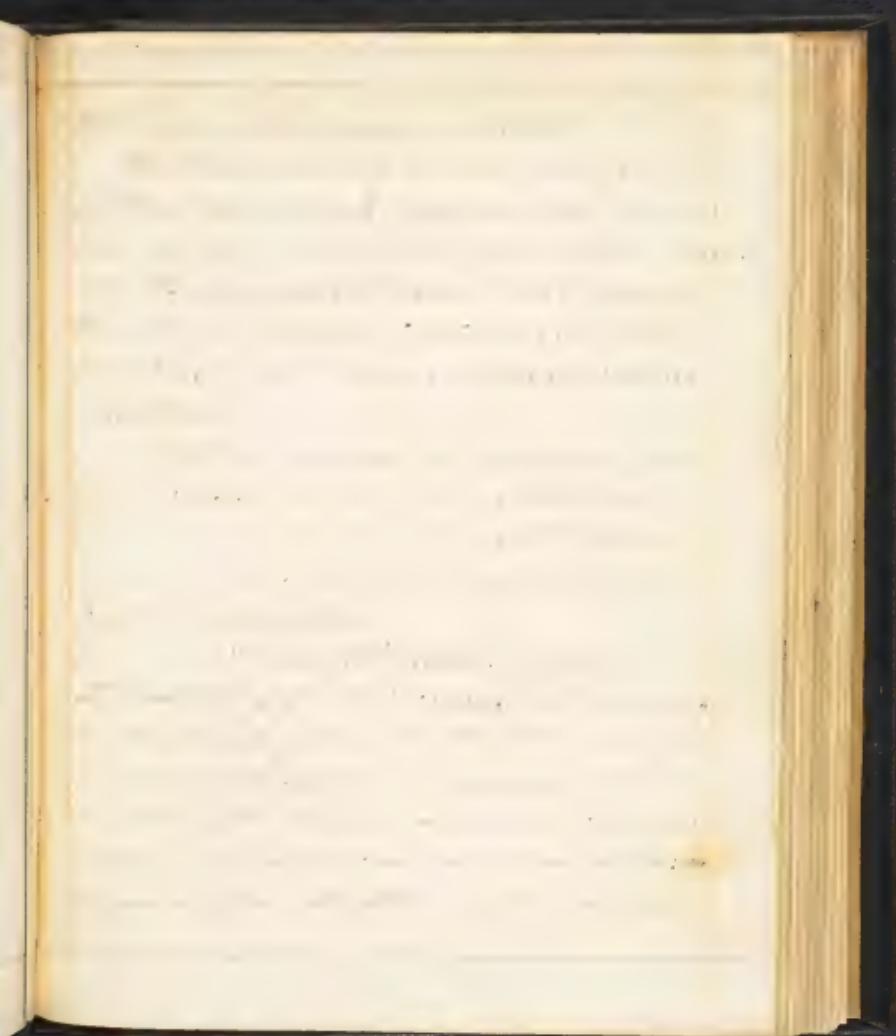


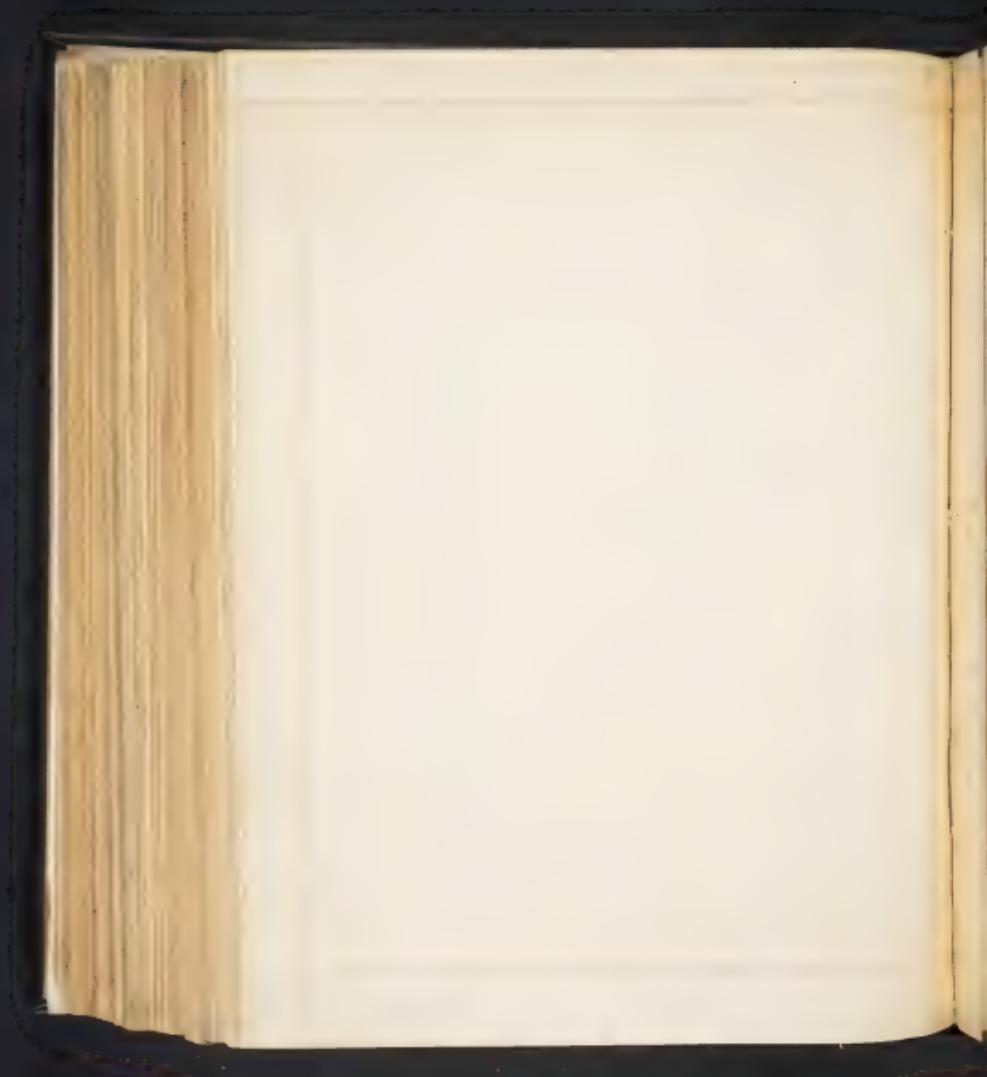










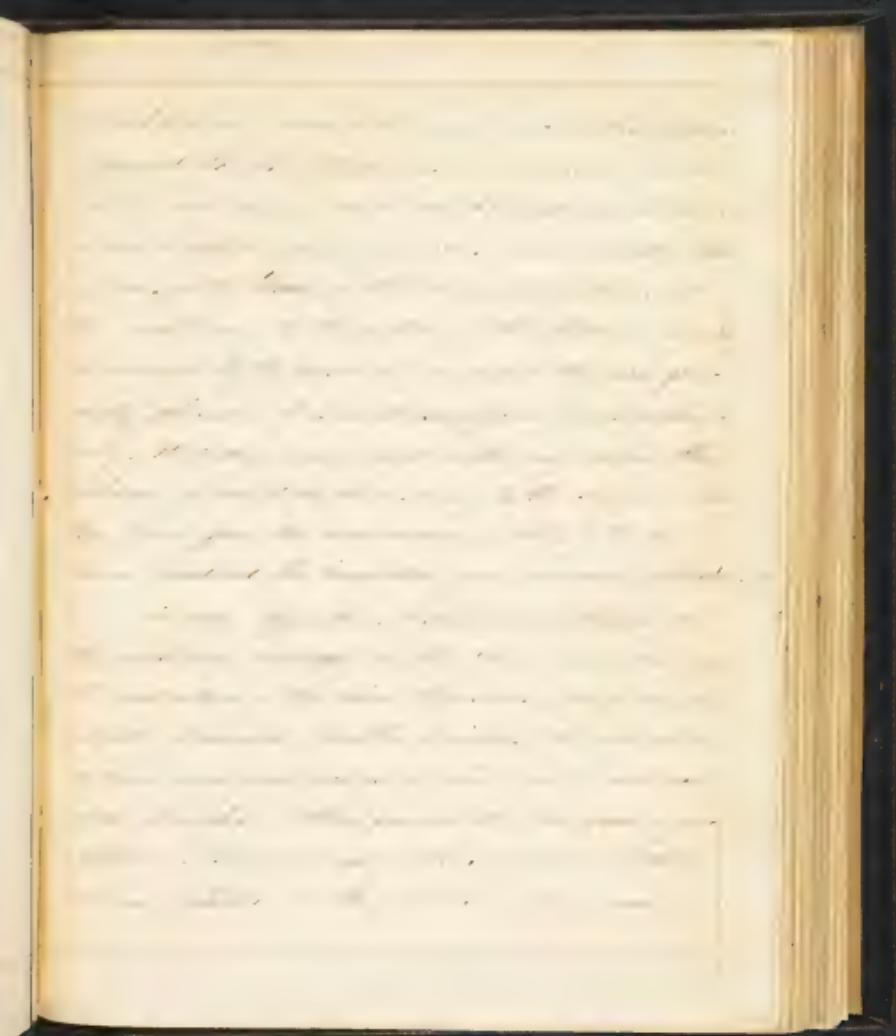




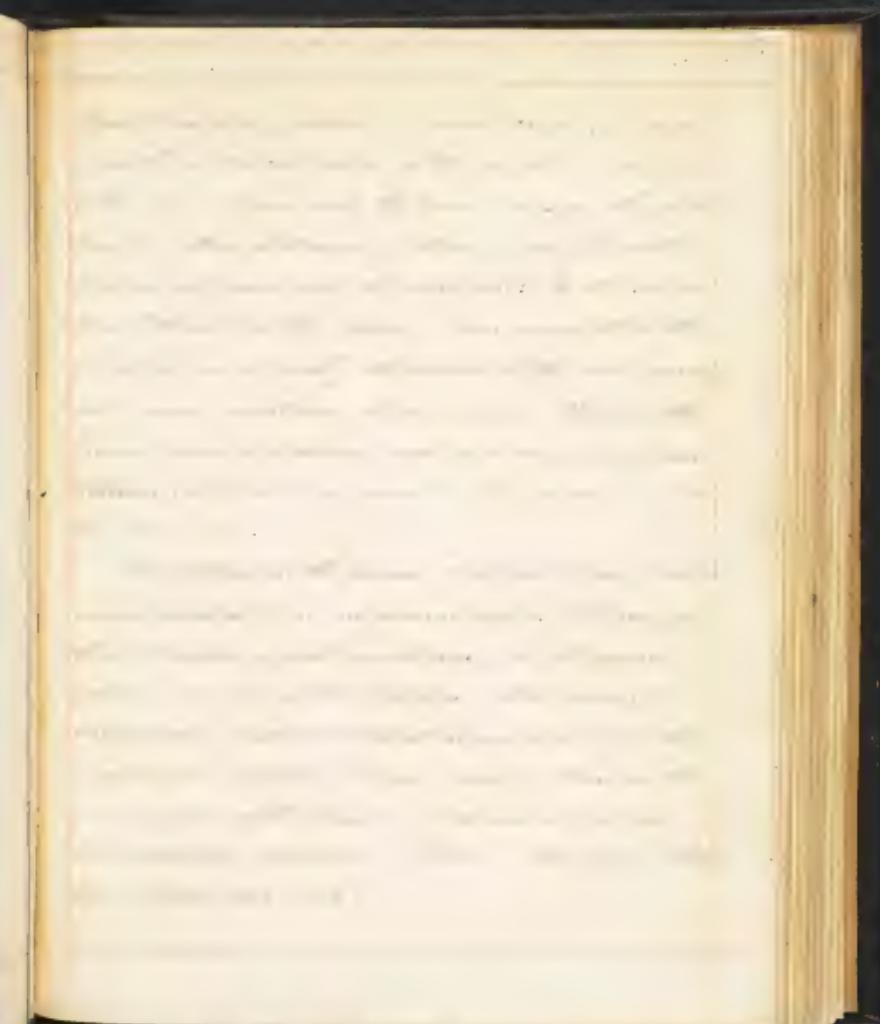








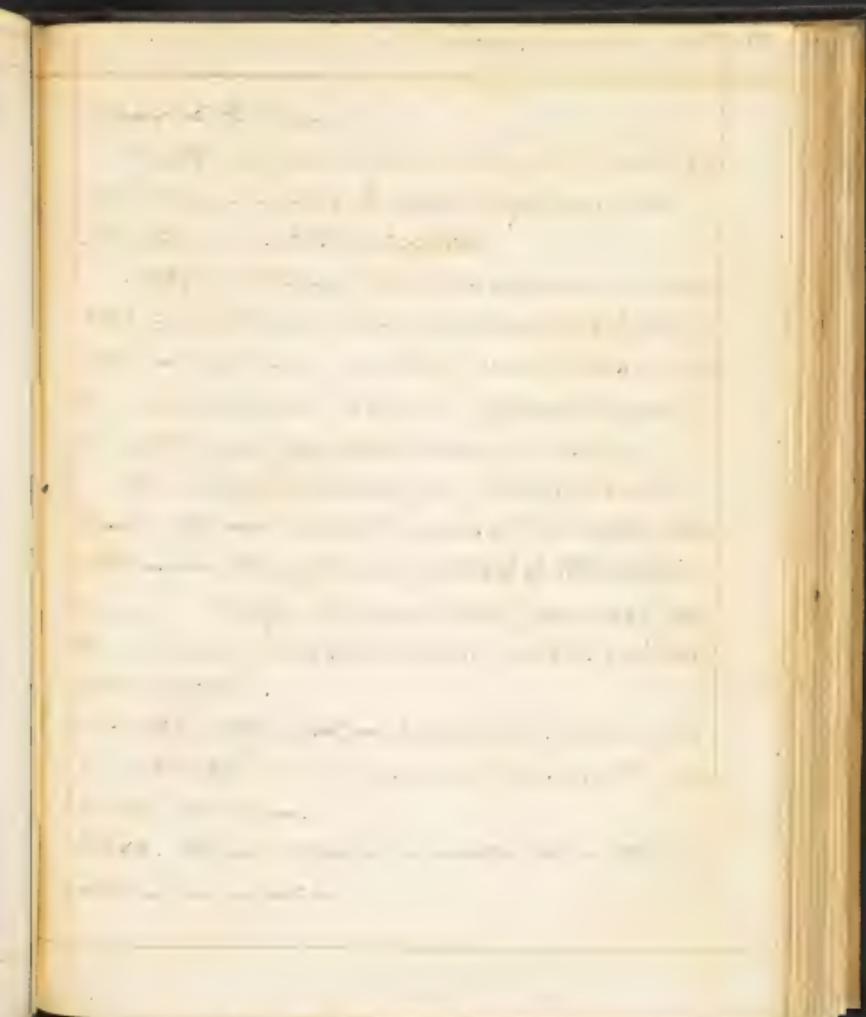




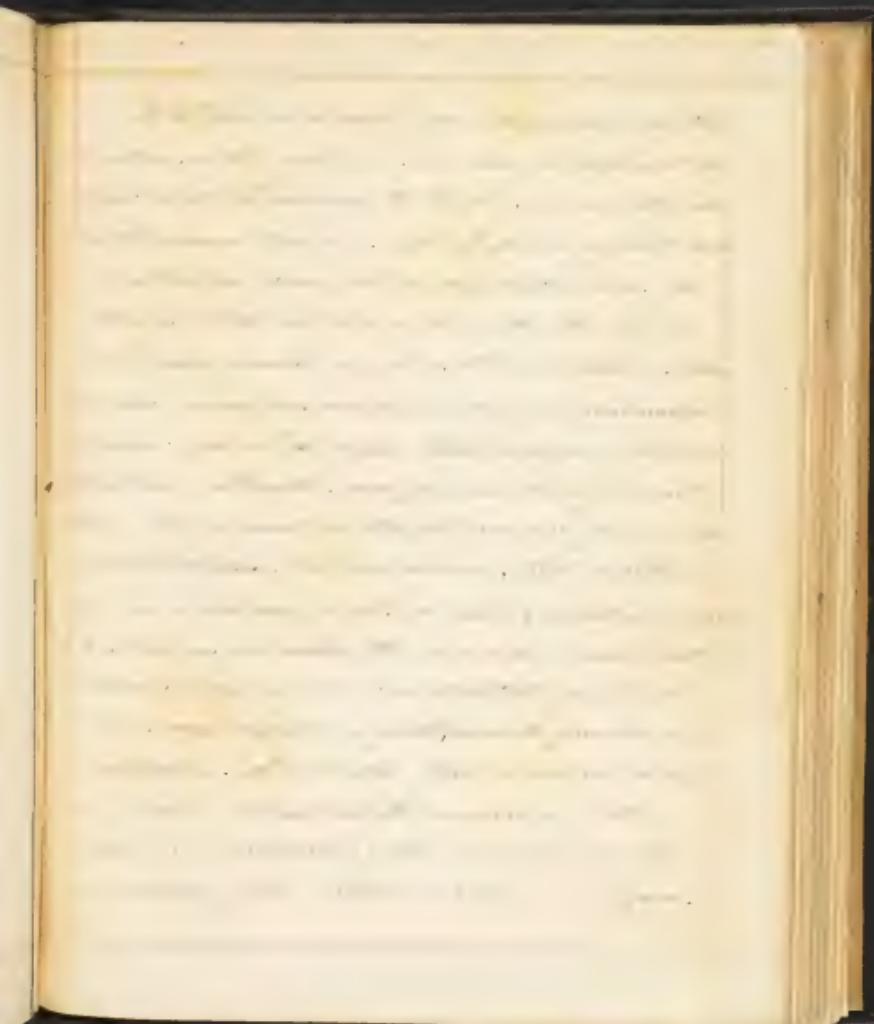










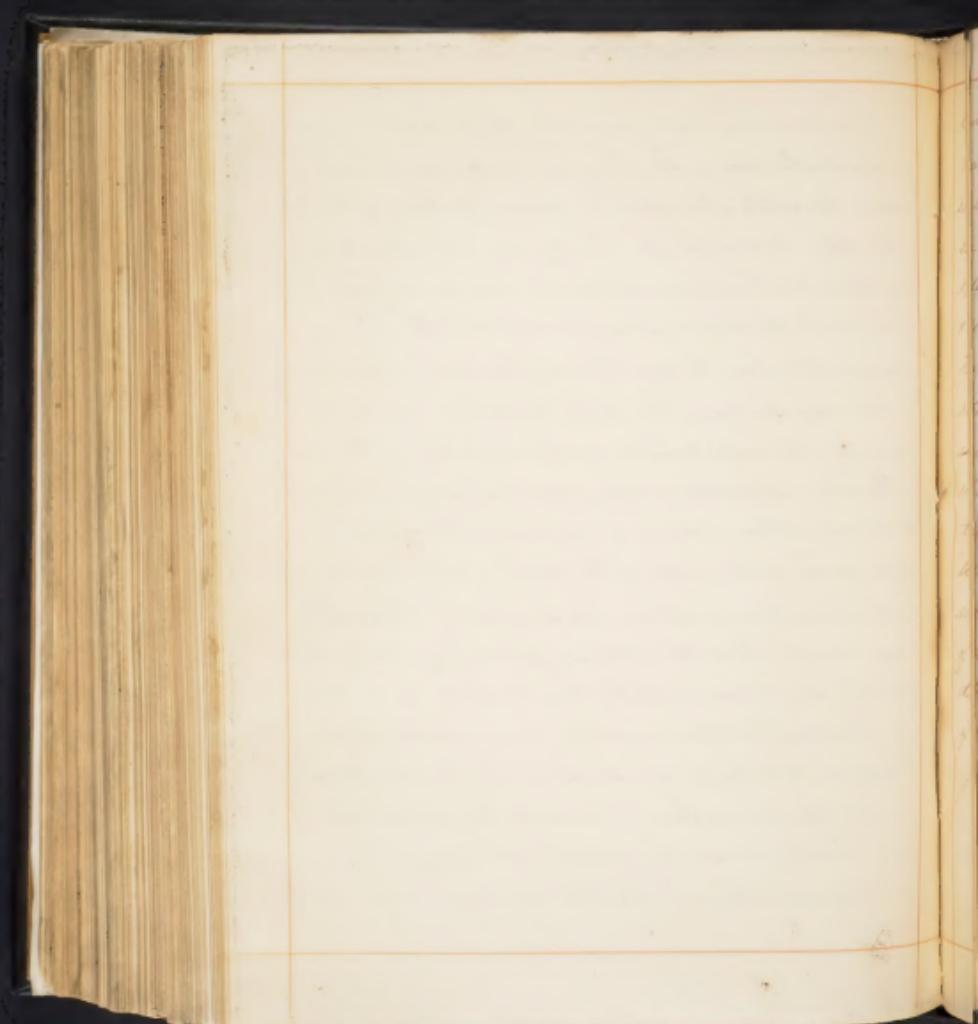




as it is so much more frequently exposed to the vivifying influence of the Air, and passes so much more speedily, through the various portions of the body. Secondly. To communicate the various ingredients of the Blood, as the Lymph, Chyle, &c; which it may be worth while to observe, are passed into the Veins & consequently have to pass through the Heart, before it is of use, may be say, divided by the Valves, & distributed &c; before it is distributed for the nutrition of the body.

Thirdly. To communicate a general impulse to all the vessels, & thus sustain a constant excitement, I consider as one of the uses of the Heart & not the least unimportant of either. In support of this, I may observe that the Vessels generally have deep dilatations, which most Authors consider as a provision of security for their security from wounds, but I believe both the giving an impulse to surrounding parts & the prevention of wounds were intended by it.

What tends to support the supposition of the impulse being of special service in the animal



Economy is, that the Heart is attached to such a  
mechanism to the Arteries, that when it has contracted,  
it recoils & communicates such an impulse to  
the Arteries, &c. that it can very evidently be seen  
externally, now by the Laws of Mechanics, action  
& reaction are always equal - consequently the  
Heart receives as great an impulse of Blood as the  
Arteries - We also see (when a portion of the Cranium  
is removed) the Brain pulsating from the impulse  
which is communicated to it, by the alternate con-  
traction, dilatation, & locomotion of the Arteries  
inserted at the base of the Cranium - Must not this  
motion, perform some special service in the economy  
of the Brain? Could an organ of so importance &  
delicate structure be subjected to such an impulse  
if it did not assist in the performance of its  
functions?

